Using Numerical Weather Prediction Ensembles to Anticipate Flows in Urban Area

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Using Numerical Weather Prediction Ensembles to Anticipate Flows in Urban Area

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Weather forecasts can provide valuable information to improve the operational performance of urban drainage systems (UDS) and wastewater treatment plants (WWTPs). For example, radar-based rainfall forecast are increasingly being used within real-time control (RTC) concepts (Vezzaro et al. 2014). Numerical weather prediction (NWP) models can also contribute to forecasting rainfall with the advantage of an increased lead-time. For example Meneses et al. (2015) use NWPs to generate operational flood warnings, and Bjerg et al. (2015) described the potential of flow domain forecasting using NWP to optimise energy consumption: The UDS can be used as buffer when no rain is expected to control the timing of energy consumption which, enables coupling with the electrical smart grid system optimizing expenses and CO_2 footprint.

Using uncertain information, such as NWP, to optimize storm- and wastewater systems in real time is generally challenging. Indeed, NWP is embedded with a significant uncertainty. Therefore Ensemble Prediction Systems (EPS) are generated and prediction strategies using multiple ensemble members are implemented e.g. (Courdent et al. 2015), Figure 1 illustrates the principal.

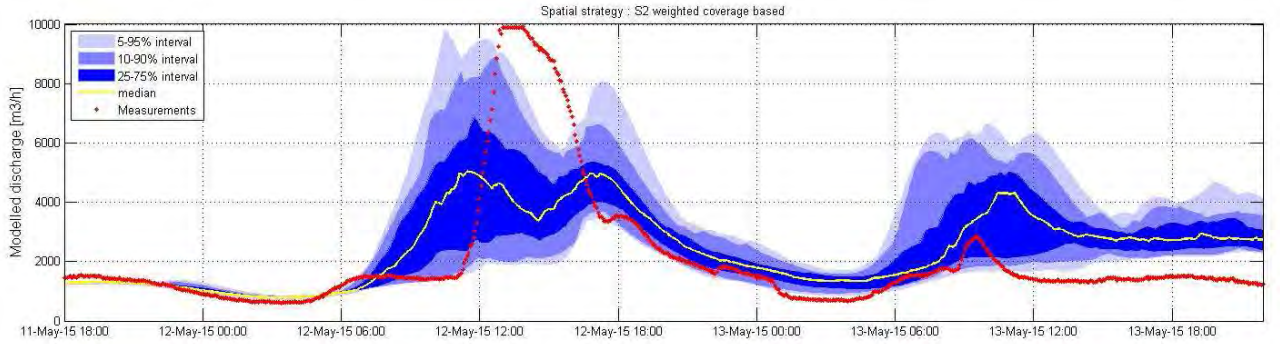

Figure 1: Flow prediction at Damhuså catchment generated the 11th of May 2015 at 18:00 using the DMI-HIRLAM-S05 NWP model

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